

## ABSTRACT

A method and system for providing a magnetic element capable of storing multiple bits is disclosed. The method and system include providing first pinned layer, a first nonmagnetic layer, a first free layer, a connecting layer, a second pinned layer, a second nonmagnetic layer and a second free layer. The first pinned layer is ferromagnetic and has a first pinned layer magnetization pinned in a first direction. The first nonmagnetic layer resides between the first pinned layer and the first free layer. The first free layer being ferromagnetic and has a first free layer magnetization. The second pinned layer is ferromagnetic and has a second pinned layer magnetization pinned in a second direction. The connecting layer resides between the second pinned layer and the first free layer. The second nonmagnetic layer resides between the second pinned layer and the second free layer. The second free layer being ferromagnetic and having a second free layer magnetization. The magnetic element is configured to allow the first free layer magnetization and the second free layer magnetization to change direction due to spin transfer when a write current is passed through the magnetic element.